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09/680,277	10/06/2000	Je Hong Kim	2658-0242P	8486

7590 09/03/2002

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Falls Church, VA 22040-0747

EXAMINER

RUDE, TIMOTHY L

ART UNIT PAPER NUMBER

2871

DATE MAILED: 09/03/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/680,277

Applicant(s)

KIM ET AL.

Examiner

Timothy L Rude

Art Unit

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-- Th MAILING DATE of this communication appears on the cover sheet with the corresponding address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 July 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7, 8, 11, 13-16 and 18 is/are rejected.
- 7) ☒ Claim(s) 6, 9, 10, 12 and 17 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 05 July 2002 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Oath/Declaration

1. The supplemental declaration is received, and the objection to the Oath/Declaration is withdrawn.

Drawings

2. The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on 05 July 2002 are approved by the examiner. A proper drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance. Any review of the drawings by the draftsman is presently premature.

Specification

3. The abstract is amended and the specification is amended. However, the disclosure is objected to because of the following informalities: the following reference sign(s) are not mentioned in the description: Figure 3, items 60 and 74.

Appropriate correction is required.

Claims

4. Claims 2, 3, 7, 8, 10, 13, 15, 16, and 18 are amended, and the objection to claim 15 is withdrawn. The rejection of claim 18 under 35 USC 112, second paragraph is withdrawn.

Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art (APA).

As to claim 1, APA discloses a back light unit in Figures 1 and 2 (page 1, line 14 through page 4, line 5), in a liquid crystal display, comprising: a light input, 20, for leading a light path of a light beam to the rear side thereof to obtain focusing (reflection of the light beam substantially into the light guide) of the light beam.

APA does not explicitly disclose a high degree of focusing.

Since APA discloses a light input, 20, for focusing light substantially into the light guide, it would be an obvious expedient to highly focus the light input to maximize illumination efficiency. Motivational advantages include a more brilliant display image,

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reduced light source wattage requirements, improved battery life in mobile display units, reduced bright lines in the display near the light source, and better performance when used in combination with certain light guide internal reflection patterns (lateral grooves, ribs, or lens arrays).

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the light input of APA to be highly focused.

As to claim 2, APA discloses the back light unit according to claim 1, further comprising: a light guide, 4, for allowing the light beam from the light input to progress in the vertical direction of a liquid crystal panel in order for the light to pass up through the liquid crystal panel and be seen by the viewer located in a substantially vertical direction from the liquid crystal panel plane.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

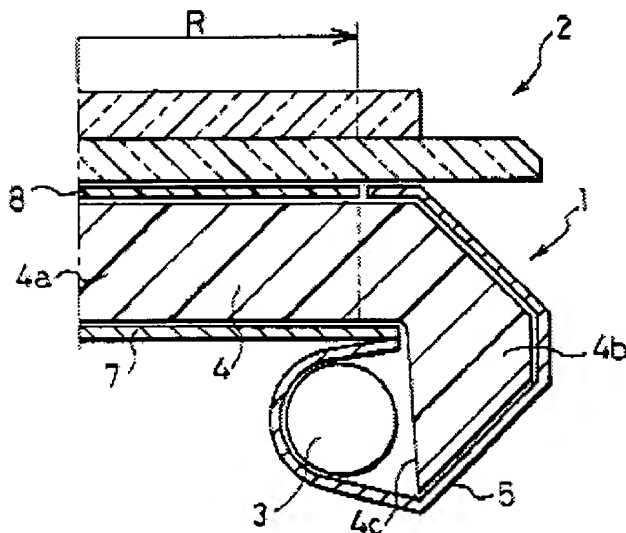
6. Claims 1-5, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over APA in view of Oyama et al (Oyama) USPAT 5,808,708.

As to claim 1, APA discloses a back light unit in Figures 1 and 2 (page 1, line 14 through page 4, line 5), in a liquid crystal display, comprising: a light input, 20, for leading a light path of a light beam to the rear side thereof to obtain focusing (reflection of the light beam substantially into the light guide) of the light beam.

APA does not explicitly disclose a high degree of focusing.

Oyama teaches in Figure 4 a light unit comprising a light-guide plate, 4a, and a reflector, 5, having a sectional view of spiral shape that efficiently guides the light (Applicant's high focus) from the light source to the light guide plate (col. 6, lines 13-24).

FIG. 4



Oyama is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add efficient reflection (high focus) to reduce bright lines in the display near the light source (col. 13, lines 33-52, especially lines 42-48).

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the light input of APA with the efficient reflection (high focus) of Oyama.

As to claim 2, APA discloses the back light unit according to claim 1, further comprising: a light guide, 4, for allowing the light beam from the light input to progress in the vertical direction of a liquid crystal panel in order for the light to pass up through the liquid crystal panel and be seen by the viewer located in a substantially vertical direction from the liquid crystal panel plane.

As to claims 3 and 4, APA discloses the back light unit according to claim 2, and a light input, 20, including: a lamp, 22, for generating the light beam; and a lamp housing, 24, reflective on the inner side thereof to lead a light path of the light beam generated from the lamp into the rear side thereof.

APA does not explicitly disclose a light-guide plate installed at height different from the light input.

Oyama teaches in Figure 4 a light-guide plate, 4a, installed at height different from the light, 3, input to reduce the outside dimensions of the entire apparatus with respect to the area of the display space (col. 2, lines 53-60) having a sectional view of spiral shape.

Oyama is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add a light-guide plate installed at height

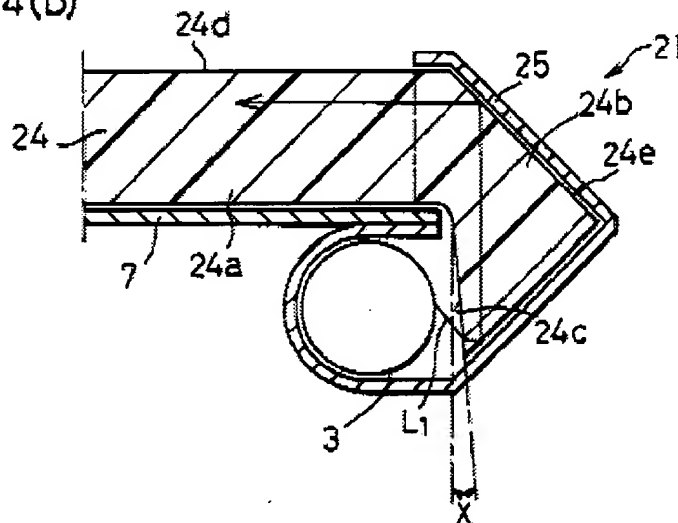
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different from the light input to reduce the outside dimensions of the entire apparatus with respect to the area of the display space.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of APA with the light-guide plate installed at height different from the light input of Oyama.

As to claim 5, Oyama teaches in Figure 14(b) a light unit wherein the reflective plate, 25, is curved to obtain a desired vertical incident angle of the light beam progressing to the light-guide plate to reduce bright lines in the display near the light source (col. 13, lines 33-52, especially lines 42-48).

FIG.14(b)



Oyama is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to use a light unit wherein the reflective plate is curved to obtain a desired vertical incident angle of the light beam progressing to the light-guide plate to provide desired illumination characteristics.

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Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of APA with the curved reflective plate of Oyama.

As to claim 7, Oyama teaches in Figure 14(a) a light unit wherein the lamp housing includes at least one reflective plate for cutting off the light beam progressing directly from the lamp into the light-guide plate, the at least one reflective plate being a protrusion of the inner surface of the lamp housing.

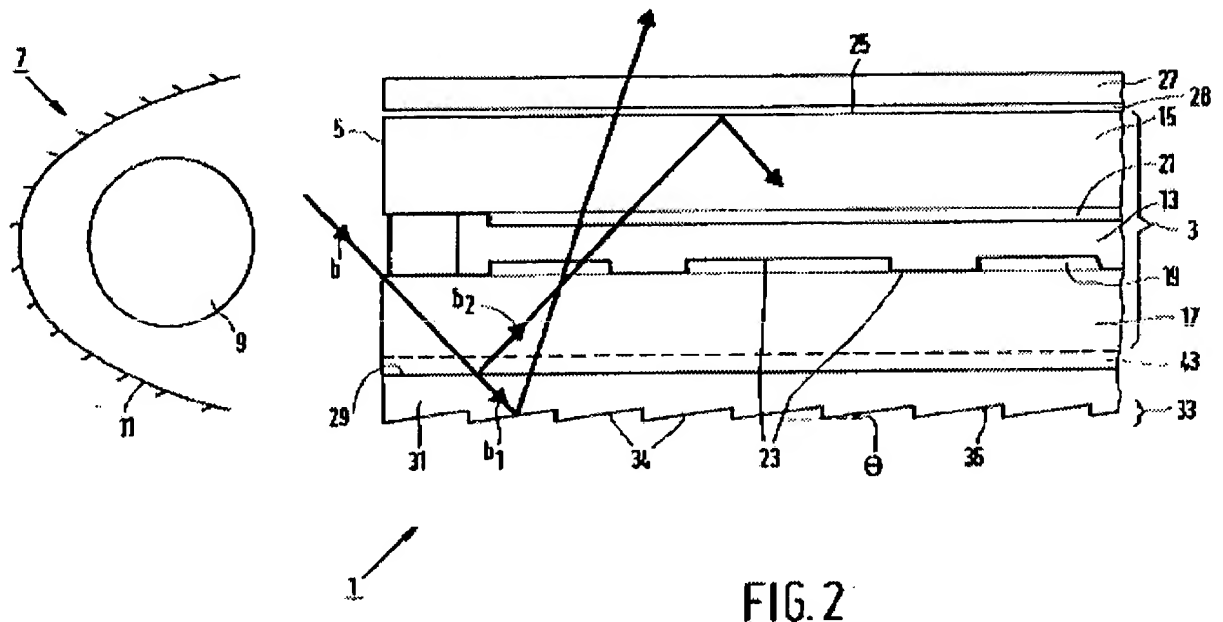
Oyama is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to use a reflective plate for cutting off the light beam progressing directly from the lamp into the light-guide plate, the at least one reflective plate being a protrusion of the inner surface of the lamp housing to provide desired illumination characteristics.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of APA with the protruding reflective plate of Oyama.

7. Claims 8, 11, 13, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over APA in view of Oyama as applied to claim 2, in view of Broer et al (Broer) USPAT 5,808,713.

As to claims 8, and 11, Broer teaches in Figure 2 a light unit wherein the

light-guide plate includes a plurality of unit patterns formed on one side thereof in parallel with the lamp, the plurality of unit patterns allowing the light beam from the lamp housing to be progressing perpendicularly into the liquid crystal panel.



Broer is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to use a light unit wherein the light-guide plate includes a plurality of triangular section unit patterns formed on one side thereof in parallel with the lamp, the plurality of unit patterns to cause the light beam from the lamp housing to be progressing perpendicularly into the [front of the (claim 16 only)] liquid crystal panel.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of APA with the triangular section unit patterns of Oyama.

As to claim 13, APA discloses in Figures 1 and 2, the use of a light unit wherein the light-guide plate is disposed at the rear side of transmissive liquid crystal panel (not illustrated, but on page 1, lines 14-22), and the lamp housing, 24, leads the light beam from the lamp to the incident side of the light-guide plate, 4, disposed at the rear side of the transmissive liquid crystal panel.

As to claim 14, APA discloses in Figures 1 and 2, a light unit further comprising a rear reflective plate, 2, for reflecting the light beam from the rear surface of the light-guide plate, 4, toward the transmissive liquid crystal panel.

8. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over APA in view of Oyama and Broer as applied to claim 14, and further in view of Kim USPAT 6,151,169.

As to claim 15, over APA in view of Broer teaches the use of a light unit according to claim 14 (Applicant's 15).

APA in view of Broer does not teach a light unit wherein the light-guide plate includes a plurality of prism patterns arranged on another surface thereof in intersection with the unit patterns.

Kim teaches in Figure 7 the use of a light unit wherein the light-guide plate includes a plurality of prism patterns arranged on another surface thereof in intersection with the unit patterns.

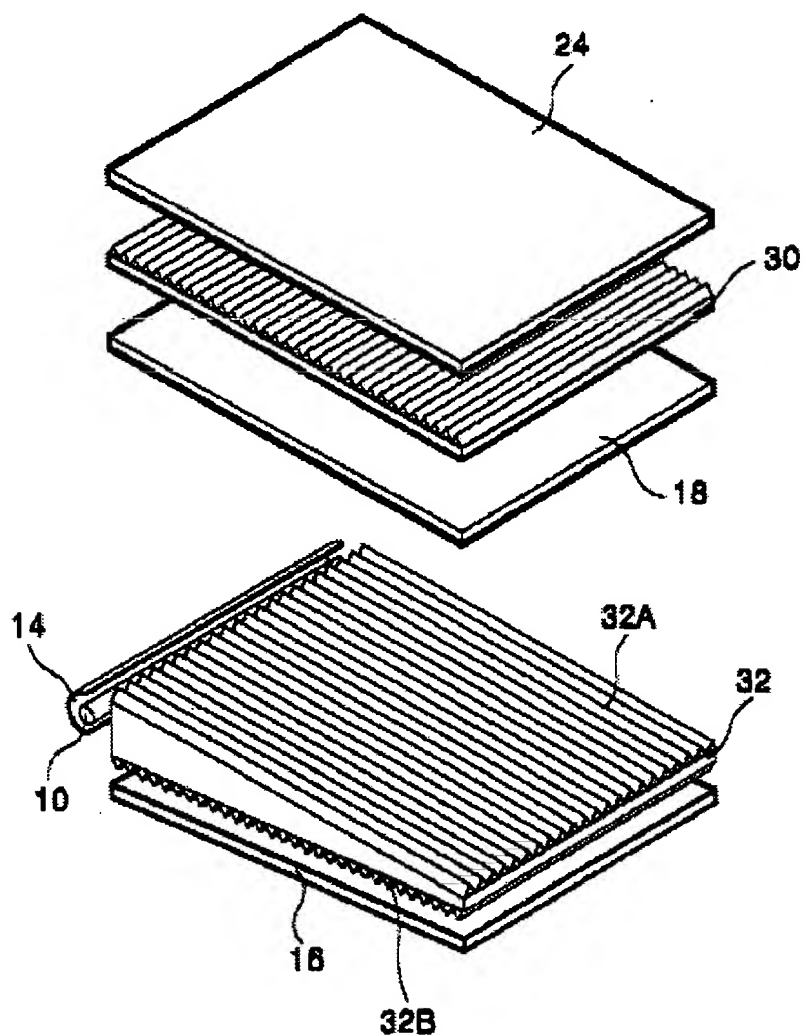


FIG. 7

Kim is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add a plurality of prism patterns arranged on another surface thereof in intersection with the unit patterns to enhance the utilization ratio of the light generated by the lamp (col. 6, line 58 through col. 7, line 15).

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of APA in view of Broer with the plurality of prism patterns arranged on another (upper) surface of the light guide plate of Kim.

9. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over APA in view of Oyama and Broer as applied to claim 8, and further in view of Egawa et al (Egawa) USPAT 6,295,104 B1.

As to claim 16, APA in view of Oyama and Broer teach a transmissive liquid crystal panel with a the light unit according to claim 8, wherein the lamp housing leads the light beam from the lamp to the incident side of the light-guide plate.

APA in view of Oyama and Broer do not explicitly disclose a light unit wherein the light-guide plate is disposed at the front side of the liquid crystal panel.

Egawa teaches in Figures 1 and 2 a light guide plate dispose on the front side of a liquid crystal panel to provide illumination without degrading contrast and without generating a moiré pattern (col. 4, lines 11-17).

FIG. 1

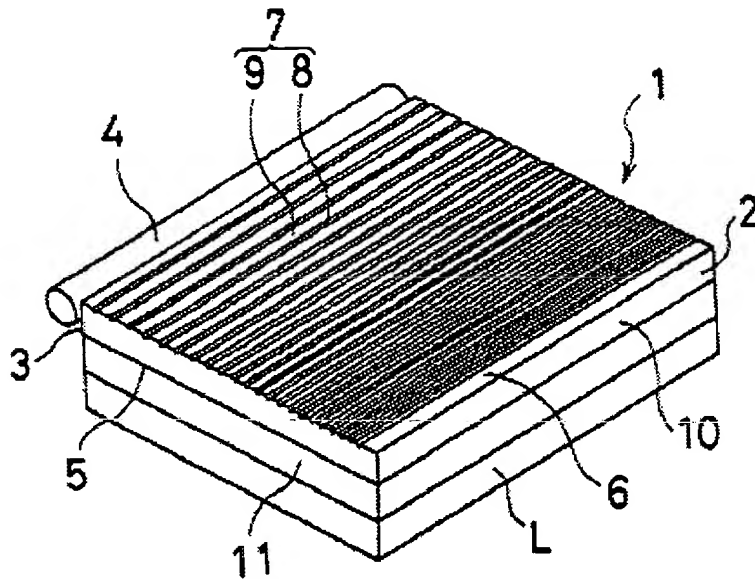
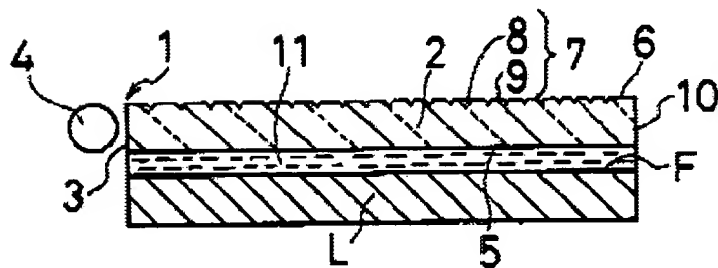


FIG. 2



Egawa is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add a light guide plate disposed on the front side of a liquid crystal panel to provide illumination without degrading contrast and without generating a moiré pattern.

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Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of APA in view of Oyama and Broer with the light guide plate disposed on the front side of a liquid crystal panel of Egawa.

As to claim 18, APA in view of Oyama and Broer teaches the light unit according to claim 8.

APA in view of Oyama and Broer do not explicitly disclose a distance between the unit patterns that gets gradually shorter as said unit patterns get farther away (Applicant's is gradually short as far away) from the incident side of the light-guide plate.

Egawa teaches in Figures 1 and 2 a light guide plate wherein a distance between the unit patterns that gets gradually shorter as said unit patterns get farther away from the incident side of the light-guide plate so that the brightness becomes nearly uniform at any position in the transparent substrate (light guide) without being influenced by the distances from the light source lamp (col. 12, lines 34-50).

Egawa is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add a distance between unit patterns that gets gradually shorter as said unit patterns get farther away from the incident side of the light-guide plate so that the brightness becomes nearly uniform at any position in the light guide without being influenced by the distances from the light source lamp.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of APA in view of

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Oyama and Broer with the distance between unit patterns that gets gradually shorter of Egawa.

Allowable Subject Matter

10. Claims 6, 9, 10, 12, and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

As to claim 6, a search of relevant prior art did not disclose, alone or in combination, the light unit according to claim 3, wherein the reflective *plate is curved to have about $\pm 20^\circ$ to 30° in a vertical incident angle of the light beam* progressing to the light-guide plate. The closest reference is Oyama, but the claimed structure is not disclosed.

As to claim 9, a search of relevant prior art did not disclose, alone or in combination, the light unit according to claim 8, wherein the unit pattern includes: *a land protruded at a desired incline from one surface of the light-guide plate; and a groove extended from the land to have a desired incline.*

Claim 10 is dependent upon claim 9 with allowable subject matter above.

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As to claim 12, a search of relevant prior art did not disclose, alone or in combination, the light unit according to claim 11, wherein *an angle between one surface of the light-guide plate and one surface of the groove is about 40° to 50°, and an angle between one surface of the light-guide plate and another surface of the groove is about 30° to 90°.*

As to claim 17, a search of relevant prior art did not disclose, alone or in combination, the light unit according to claim 16, wherein *a distance between the start point and the angular point of the land is within 200µm.*

Response to Arguments

11. Applicant's arguments filed 05 July 2002 have been fully considered but they are not persuasive.

Applicant's ONLY arguments are as follows:

(1) APA does not disclose a light input, 20, that comprises leading light to the rear side thereof.

(2) Oyama discloses a light guide plate, 4, the ends thereof forming semicircles.

(3) Oyama does not disclose or suggest a light guide wherein all portions of the light guide are installed at a height different from the height of the light input.

(4) Oyama does not disclose a light input that comprises leading light to the rear side thereof.

(5) Broer does not fill the vacancy of APA in view of Oyama.

Examiner's responses to Applicant's ONLY arguments are as follows:

(1) It is respectfully pointed out that discloses a light input, 20, that comprises leading light to the rear side thereof, because the light may reflect from the top side to the bottom side in a nearly vertical path one or more times to eventually enter the light guide. Light may also travel from the source, 22, to the lower-left portion of the reflector, 24, reflect down to the bottom, and reflect yet again into the light guide.

(2) It is respectfully pointed out that Oyama discloses a light guide plate corresponding portion, 4a, and Oyama discloses non-corresponding portions, 4b, forming semicircles. Oyama is applied because it teaches the claimed structure of the reflector, 5, and the light source, 3, location relative the corresponding portion, 4a, of the light guide of Oyama which corresponds to the APA light guide, 4. The fact that Oyama further comprises non-corresponding portions, 4b, does not make the teaching or the motivation to combine non-obvious. Therefore, the examiner maintains the claimed invention would have been obvious to those having ordinary skill in the art of liquid crystals at the time the invention was made given APA and the teachings of Oyama.

(3) It is respectfully pointed out that Oyama is applied because it teaches the claimed structure of the reflector, 5, and the light source, 3, location relative the corresponding portion, 4a, of the light guide of Oyama which corresponds to the APA light guide, 4. The fact that Oyama further comprises non-corresponding portions, 4b, at a different height does not make the teaching or the motivation to combine non-obvious. Therefore, the examiner maintains the claimed invention would have been

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obvious to those having ordinary skill in the art of liquid crystals at the time the invention was made given APA and the teachings of Oyama.

(4) It is respectfully pointed out that Oyama discloses a light input, 5, that comprises leading light to the rear side thereof. The fact that Oyama further comprises non-corresponding portions, 4b, at a different height does not make the teaching or the motivation to combine non-obvious. Therefore, the examiner maintains the claimed invention would have been obvious to those having ordinary skill in the art of liquid crystals at the time the invention was made given APA and the teachings of Oyama.

(5) It is respectfully pointed out that Broer was not applied to fill any vacancy of APA in view of Oyama.

Conclusion

12. For convenience, Applicant may also review Fredriksz et al USPAT 5,477,423. References cited but not applied are relevant to the instant application.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy L Rude whose telephone number is (703) 305-0418. The examiner can normally be reached on Monday through Thursday.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William L Sikes can be reached on (703) 308-4842. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7724 for regular communications and (703) 308-7725 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4900.



TLR
August 27, 2002

Timothy L Rude
Examiner
Art Unit 2871



TOANTON
PRIMARY EXAMINER